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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/635,381	08/05/2003	Martin S. Maltz	D/A2290	1288

41030 7590 01/26/2010
Xerox Corporation
c/o ORTIZ & LOPEZ, PLLC
P. O. BOX 4484
ALBUQUERQUE, NM 87196-4484

EXAMINER	
KAU, STEVEN Y	

ART UNIT	PAPER NUMBER
2625	

MAIL DATE	DELIVERY MODE
01/26/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/635,381	MALTZ ET AL.	
	Examiner	Art Unit	
	STEVEN KAU	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 October 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8 and 10-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 & 10-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/18/09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 29, 2009 has been entered.

Response to Amendment

2. This is in response to Applicant(s) arguments filed on 9/8/2009 and 10/29/2009.

- The following is the current status of claims:

Claim 9 has been canceled. Claim 23 has been added as an independent claim. Claims 1-8 and 10-23 remain pending for examination.

- IDS Submitted for consideration:

Applicant submitted IDS on 11/18/2009 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

- Response to Remarks/Arguments:

(1) Applicant's arguments, section "Specification Objections", page 7, Remarks, 9/8/2009, have been fully considered and are persuasive. The

specification objections under 37 CFR 1.83(a) has been withdrawn from the record.

(2) Applicant's arguments, section "Claim Objections", page 7, Remarks, 9/8/2009, with respect to claims 7 and 8 have been fully considered and are persuasive. The claim objections under 37 CFR 1.83(a) has been withdrawn from the record.

(3) Applicant's arguments, section "Claim Rejections – 35 U.S.C. §112", pages 7-9, Remarks, 9/8/2009, with respect to claims 1-8 and 10-22 have been fully considered and are persuasive. The rejections of claims 10-22 under 35 U.S.C. § 112 First Paragraph, and the rejections of claims 1-8 and 10-22 under 35 U.S.C. § 112 Second Paragraph have been withdrawn from the record.

(4) Applicant's arguments filed 9/8/2009 and 10/29/2009, with respect to claims 1-22 have been fully considered but they are not persuasive for the following reasons, see sections I (response to Remarks/Arguments) and II (repeated rejections).

MPEP 2111: During patent examination, the pending claims must be "given the broadest reasonable interpretation consistent with the specification" Applicant always has the opportunity to amend the claims during prosecution and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. In re Prater, 162 USPQ 541,550-51 (CCPA 1969). The court

found that applicant was advocating ... the impermissible importation of subject matter from the specification into the claim. See also In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997) (The court held that the PTO is not required, in the course of prosecution, to interpret claims in applications in the same manner as a court would interpret claims in an infringement suit. Rather, the "PTO applies to verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definition or otherwise that may be afforded by the written description contained in application's specification.").

The broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach. In re Cortright, 165 F.3d 1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999).

MPEP 2141.02: In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); Schenck v. Nortron Corp., 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983) (Claims were directed to a vibratory testing machine (a hard-bearing wheel balancer) comprising a holding structure, a base structure, and a supporting means which form “a single integral and gaplessly continuous piece.” Nortron argued the invention is just making integral what had been made in four bolted pieces, improperly limiting the focus

to a structural difference from the prior art and failing to consider the invention as a whole. The prior art perceived a need for mechanisms to dampen resonance, whereas the inventor eliminated the need for dampening via the one-piece gapless support structure. “Because that insight was contrary to the understandings and expectations of the art, the structure effectuating it would not have been obvious to those skilled in the art.” 713 F.2d at 785, 218 USPQ at 700 (citations omitted).). See also In re Hirao, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) (Claims were directed to a three step process for preparing sweetened foods and drinks. The first two steps were directed to a process of producing high purity maltose (the sweetener), and the third was directed to adding the maltose to foods and drinks. The parties agreed that the first two steps were unobvious but formed a known product and the third step was obvious. The Solicitor argued the preamble was directed to a process for preparing foods and drinks sweetened mildly and thus the specific method of making the high purity maltose (the first two steps in the claimed process) should not be given weight, analogizing with product-by-process claims. The court held “due to the admitted unobviousness of the first two steps of the claimed combination of steps, the subject matter as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.” 535 F.2d at 69, 190 USPQ at 17 (emphasis in original). The preamble only recited the purpose of the process and did not limit the body of the claim. Therefore, the claimed process was a three step process, not the product formed by two steps of the process or the third step of using that product.).

MPEP 2106: Limitations appearing in the specification but not recited in the claim should not be read into the claim. E-Pass Techs., Inc. v. 3Com Corp., 343 F.3d 1364, 1369, 67 USPQ2d 1947, 1950 (Fed. Cir. 2003) (claims must be interpreted "in view of the specification" without importing limitations from the specification into the claims unnecessarily). In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969). See also In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) ("During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow.... The reason is simply that during patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed.... An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process.").

Applicant's arguments, pages 7-10, Remarks, 10/29/2009, section (35 USC §103a), with respect to claim 10, which has been amended, and the newly added claim23, have been fully considered but they are not persuasive. Because, both the amended claim 10 and the newly added claim has not been examined and prosecuted by the Examiner, and the arguments with respect to the newly submitted claim 10 with amendments, and the newly added claim is therefore irrelevant. However, these claims will be examined in this Action for their patentability.

In response to applicant's argument, page 13, section (35 USC §103), that prior arts do not teach or suggest “automatic input”, the use of “color sensor” for color value measuring, “iterative controller, and the reference contains "color conversion table", etc., are not persuasive. As stated in the final Action, 7/27/2009, prima facie evidence has been established and detail discussions were given, and the examiner does not change position and believe the rejection is proper. In addition, applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., “The presently claimed iterative controller is not used to instruct a printer on how much of each color to paint on a piece of paper. It is used to control the iterative process described in the present claims and disclosure, to reduce the particular dimensional order based on a determination of which color value among said plurality of color values has attained a gamut limit”, page 16, Remarks) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns,* 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicants further argue that prior art Shimizu ‘277 in view of Mahy ‘109 do not teach and suggest “transformation module”. The examiner respectfully disagrees. Again, a prima facie evidence already discussed in the final Action as well as in the Advisories, 11/6/2008 and 9/18/2009.

Applicants arguments in the remaining pages are similar to the above rational and the Examiner refers the applicants to the responses and claims rejections in the previous Actions and advisories.

The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

For the above reasons, it is believed that the last Office Action dated 12/13/2007 was proper. Therefore, the rejection is maintained for claim 1 and its dependent claims 2-8. Claims 10-23 are rejected with new ground of rejection due to amendments.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under

37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 10-12, 15-16 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al (US 7,167,277) in view of Mahy (US 5,832,109) and Mestha et al (US 6,236,474).

Regarding **claim 10**.

Shimizu discloses system (**e.g. the system of Fig 18, col 28, lines 5-47**), comprising:

a plurality of color values (**such as L255*, a255* & b255* value, corresponding to CMY color data value, col 2, lines 28-59, and as shown in Fig. 5, L*a*b* value is input to the system for process, col 10, lines 10-35**) automatically provided as input to an image processing device (**e.g. L*a*b* values based on the measurement of a patch outputted from the printer corresponding to CYM values are as input initial value; since the L*a*b* values obtained and inputted in the process are not manually performed, rather, the programmed process is executed and performed by a computer of Figs. 18 and 19, thus, data is automatically provided as input to the image processing device shown in Figs. 18 & 19; see Fig. 5, col 10, lines 12-16**), wherein said image processing device is under a control of a particular dimensional order (**e.g. processing in three three-dimensional arrays, col 13, lines 51-65**); a

color sensor (**e.g. measurement of L*a*b* values indicates that a color sensor must be used for color measuring, col 11, lines 65-67 & col 12, lines 1-19**) for dynamically determining which color value among said plurality of color values has attained a gamut limit (**e.g. Shimizu discloses a flowchart or algorithm which has a steps to determine shortest distance from boundary of color gamut in Figs. 7 & 9, judging whether color value is near the color gamut boundary which is actively or dynamically performed, col 13, lines 5-37 & col 15, lines 41-66**); an iterative controller (**e.g. "iterative controller", a controller processes an iteration loop(s); Shimizu discloses an example of the controller of a printer processes color value for each pixel, col 1, lines 24-35, and the processes of Figs. 7, 12 and 13 for generating a color conversion table for printers for converting L*a*b* values to CMY values indicate multiple iteration processes, col 11, line 60 to col 12, line 42, and so on; thus, the controller of a printer must perform iterative loops in the processes of Figs. 7, 12 and 13**); and within said iterative controller (**e.g. a conversion table for printer/controller to convert L*a*b* values to CMY values and thus the conversion table is indeed within the controller, col 11, line 60 to col 12, line 42; and in addition, conversion unit or module converts color data to color data inside a target color gamut and is within the color conversion apparatus 10 and is controlled by printer controller, Fig. 17, col 27, lines 37-58**).

Shimizu does not explicitly disclose that a transformation module for automatically reducing said particular dimensional order based on determining which color value among said plurality of color values has attained said gamut limit; an adder

module for adding feedback obtained through said transformation module, thereby providing improved control for colors that are located external to said gamut.

In the same field of endeavor, Mahy teaches that a transformation module for automatically reducing said particular dimensional order based on determining which color value among said plurality of color values has attained said gamut limit (**e.g. Mahy discloses an example mathematical model of 3-ink process with one color value c_1 reaches its limit at 0, dimensional order of 3-ink process is automatically reduced to 2-ink process because an n-ink process is completely characterized by its colorant gamut with a number of colorant limitations, col 14, lines 50-64 & col 1, lines 49-58**);

In the same field of endeavor, Mahy's teaching is combinable to modify Shimizu et al reference for reducing dimensions. For example, **"If the amount of conversion C is 10 or less, it is judged that the point is near to a color gamut boundary, and a point (Ld0, ad0, bd0) in an L*a*b* space is converted to the nearest point on the color gamut boundary on the condition that Ld0=L0, ad0=a0 and bd0=b0 using the closest neighborhood method described earlier in which problem 1 is likely to occur (step S19)"** (col 13, lines 5-15), and by combining Mahy's teaching with Shimizu et al's reference, dimensional order of 3-ink can be reduced to a two-ink process, which, can improve the out of gamut color control process; and

In the same filed of endeavor, Mestha teaches an adder module (**i.e. a summing node**) for adding feedback obtained through said transformation module (**i.e. referring to Fig. 2, Controller 114 includes an adder for adding feedback obtained through**

the transformation block, or module, col 4, lines 3-50), thereby providing improved control for colors that are located external to said gamut (**i.e. gamut color error is corrected and thereby to improve image reproduction quality, Figs. 2 and 3, col 4, line 3 to col 5, line 29**).

Having a system of Shimizu ’277 reference and then given the well-established teaching of Mahy ’109 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Shimizu ’277 reference to include a transformation module for automatically reducing said particular dimensional order based on determining which color value among said plurality of color values has attained said gamut limit, thereby providing improved control for colors that are located external to said gamut as taught by Mahy ’109 reference; and to include an adder module for adding feedback obtained through said transformation module, thereby providing improved control for colors that are located external to said gamut as taught by Mestha ’474. The motivation for doing so would have been to improve the control of an L*a*b* value of a certain color which is outside a target color gamut and hence for better image reproduction quality, and further the disclosures provided by Mahy ’109 and Mestha ‘474 could be implemented by one another with predictable results.

Regarding **claim 11**, in accordance with claim 10.

Dependent claim 11 recites identical features as claim 10. Thus, arguments similar to that presented above for claim 10 are also equally applicable to claim 11.

Regarding **claim 12**, in accordance with claim 10

Shimizu teaches wherein said particular dimensional order comprises a three-dimensional order (**e.g. color conversion table is used to store the calculated three-dimensional arrays of C[L][a][b], M[L][a][b] and Y[L][a][b], col 12, lines 30-42**).

Regarding **claim 15**, in accordance with 12.

Shimizu differs from claim 15, in that he does not teaches wherein said transformation module further comprises a transformation module for reducing said three-dimensional order to a one-dimensional order

Mahy teaches wherein said transformation module further comprises a transformation module for reducing said three-dimensional order to a one-dimensional order (**Mahy discloses an mathematical model showing how a 3-dimensional order is reduced to 1-dimensional order, col 12, lines 36-64**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu to include a said transformation module further comprises a transformation module for reducing said three-dimensional order to a one-dimensional order taught by Mahy because it helps to determine the exact boundaries of the color gamut per lightness level from a set of discrete points (col 4, lines 17-43). Therefore, by combining Shimizu with Mahy, a predictable success of controlling out-of-gamut memory and index color can be achieved.

Regarding **claim 16,** recite identical features as claim 15. Thus, arguments similar to that presented above for claim 15 are also equally applicable to claim 16.

Regarding **claim 19**, **in accordance with claim 10.**

Shimizu teaches a color rendering device (**e.g. printer**) associated with said transformation module and wherein said transformation module is integrated with said image processing device (**refer to Figs 6-7 and Figs. 18 & 19, a color conversion table for printer for converting L*a*b* values to CMY values, col 60 to col 12, line 19**).

Regarding **claim 20**, **in accordance witch claim 10.**

Shimizu discloses an iterative controller's iterative output is input to said color rendering device (**Input/Output Device 25 of Fig. 18 & Printer 32 of Fig. 19**), such that said iterative output of said iterative controller reflects a plurality of compensated color values requiring correction for rendering variations thereof (**e.g. the process of color transform and compensation is performed for each color value data of each pixel by the controller of a printer, col 1, lines 30-40,; thus the processes of Figs. 5-16, must repeated for each pixel color value data**).

5. Claims 13-14, 17-18, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al (Shimizu) (US 7,167,277) in view of Mahy (US 5,832,109) and Mestha et al (US 6,236,474) as applied to claims 10 and 12, and further in view of Holub (US 6,750,992).

Regarding **claim 13**, in accordance with claim 12.

Shimizu differs from claim 13, in that he does not teach wherein said compensation module further comprises a transformation module for reducing said

three-dimensional order to a two-dimensional order using a standard International Color Consortium (ICC) framework.

Mahy teaches wherein said transformation module for reducing said three-dimensional order to a two-dimensional order (**e.g. reducing a 3-dimensioanl color space to a two-color space, col 12, lines 19-32**); and

Holub teaches compensation using a standard International Color Consortium (ICC) framework (**compensation function LUTs to compensate for any non-linearities between light intensity, etc., col 20, lines 4-34 and using the internationally accepted standard, i.e. ICC, col 44, lines 65-66**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu to include a said transformation module further comprises a transformation module for reducing said three-dimensional order to a two-dimensional order taught by Mahy because it helps to determine the exact boundaries of the color gamut per lightness level from a set of discrete points (col 4, lines 17-43), and then to modify the combination of Shimizu and Mahy to include compensation using a standard International Color Consortium (ICC) framework as taught by Holub. The motivation is to compensate color value difference with a well recognized standard which quantifies color in term s of what normal humans see, rather than in terms of a specific samples or instances of color produced by particular equipment. Therefore, by combining Shimizu with Mahy and Holub, a predictable success of controlling out-of-gamut memory and index color can be achieved.

Regarding **claim 14**, in accordance with claim 13.

Shimizu differs from claim 14, in that he does not teaches wherein said compensation module reduces said three-dimensional order to said two-dimensional order in response to determining which colors among said plurality of colors have attained said gamut limit.

Mahy teaches wherein said transformation (or compensation) module reduces said three-dimensional order to said two-dimensional order in response to determining which colors among said plurality of colors have attained said gamut limit (**Fig. 3, col 12, lines 19-32 and col 14, lines 34-64**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu to include a said transformation (compensation) module reduces said three-dimensional order to said two-dimensional order in response to determining which colors among said plurality of colors have attained said gamut limit taught by Mahy because it helps to determine the exact boundaries of the color gamut per lightness level from a set of discrete points (col 4, lines 17-43). Therefore, by combining Shimizu with Mahy, a predictable success of controlling out-of-gamut memory and index color can be achieved.

Regarding **claims 17 and 18, in accordance with claim 10.**

Shimizu and Mahy differ from claims 17 and 18, in that both Shimizu and Mahy do not teach wherein said color sensor comprises an offline sensor and an inline sensor.

Holub teaches wherein said color sensor comprises an offline sensor (**referring to Fig. 3A, and col 11, lines 66-67 & col 12, lines 1-19, an offline sensor, a color**

measuring instrument, or CMI for measuring the color output of the rendering device) and an inline sensor **(referring to Figs. 3B-C, and col 15, lines 42-67 & col 16, lines 1-24, an inline sensor, a CMI as a unitary colorimeter SOM 13 take color measurements via lens system by connecting to the fiber optic pickup**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu and Mahy to include an offline sensor and an inline sensor taught by Holub to improve communication, control and quality of color reproduction (**col 3, lines 3-15**). Therefore, by combining Shimizu and Mahy with Holub, a predictable success of controlling out-of-gamut memory and index color can be achieved.

Regarding **claim 21**, in accordance witch claim 18.

Shimizu teaches wherein said color rendering device comprises a printer (**Printer 32 of Fig. 19**).

Regarding **claim 22**, in accordance witch claim 18.

Shimizu teaches wherein said color rendering device comprises a photocopy machine (**Input/Output Device 25 of Fig. 18**).

6. Claims 1-4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al (Shimizu) (US 7,167,277) in view of Mahy (US 5,832,109).

Regarding **claim 1**.

Claim 1 is directed to a method claim in which the image process is performed by an image processing device and thus it meets the 35 U.S.C. 101 statutory requirements.

Shimizu discloses a method, comprising: automatically providing a plurality of color values (**such as L255*, a255* & b255* value, corresponding to CMY color data value, col 2, lines 28-59, and as shown in Fig. 5, L*a*b* value is input to the system for process, col 10, lines 10-35**) as input to an image processing device (**e.g. L*a*b* values based on the measurement of a patch outputted from the printer corresponding to CYM values are as input initial value; since the L*a*b* values obtained and inputted in the process are not manually performed, thus data is automatically provided as input to the image processing device shown in Figs. 18 & 19; see Figs. 5 & 7, col 11, line 65 to col 12, line 19 for full detail**), wherein said image processing device is under a control of a particular dimensional order (**e.g. processing in three three-dimensional arrays, col 13, lines 51-65**);

dynamically determining which color value among said plurality of color values has attained a gamut limit (**e.g. Shimizu discloses a flowchart or algorithm which has a steps to determine shortest distance from boundary of color gamut in Figs. 7 & 9, judging whether color value is near the color gamut boundary which is actively or dynamically performed, col 13, lines 5-37 & col 15, lines 41-66**);.

Shimizu does not disclose that transforming said particular dimensional order of said color which was determined to have attained said gamut limit, in response to dynamically determining which color value among said plurality of color values has

attained gamut limit; and thereafter automatically reducing said particular dimensional order through use of a dedicated gamut mapping function utilized to determine surface points and axes, thereby allowing for an improved estimate of said color based on said reduced dimensional order, thereby providing improved control for colors that are located external to said gamut and maintaining said color's hue.

Mahy teaches that that transforming said particular dimensional order of said color which was determined to have attained said gamut limit, in response to dynamically determining which color value among said plurality of color values has attained gamut limit (**e.g. one color value c_3 reaches its limit at 0, dimensional order of 3-ink process is automatically reduced to 2-ink process because an n-ink process is completely characterized by its colorant gamut with a number of colorant limitations, col 14, lines 50-64 & col 1, lines 49-58**); and automatically reducing said particular dimensional order through use of a dedicated gamut mapping function utilized to determine surface points and axes, (**e.g. one color value c_3 reaches its limit at 0, dimensional order of 3-ink process is automatically reduced to 2-ink process because an n-ink process is completely characterized by its colorant gamut with a number of colorant limitations, col 14, lines 50-64 & col 1, lines 49-58, and a surface of colorant in a three-dimensional color space is mapped to the 2-dimensional color gamut boundaries, col 12, lines 35-49; and Figs. 14A-14H disclose cross sections of pints and axes, col 11, lines 30-50**) thereby allowing for an improved estimate of said color based on said reduced dimensional order (**e.g. Mahy discloses an example mathematical model of 3-ink**

process with one color value c_3 reaches its limit at 0, dimensional order of 3-ink process is automatically reduced to 2-ink process because an n-ink process is completely characterized by its colorant gamut with a number of colorant limitations, col 14, lines 50-64 & col 1, lines 49-58); and thereby providing improved control for colors that are located external to said gamut (**Mahy explored the method to improve control of colors that are located outside of the gamut, i.e. classes 2 and 4, col 16, 26 to col 17, line 34**) and maintaining said color's hue (**e.g. maintained constant hue, col 21, lines 10-31**).

Mahy's teaching is combinable to modify Shimizu et al reference for reducing dimensions. For example, "**If the amount of conversion C is 10 or less, it is judged that the point is near to a color gamut boundary, and a point (Ld0, ad0, bd0) in an L*a*b* space is converted to the nearest point on the color gamut boundary on the condition that Ld0=L0, ad0=a0 and bd0=b0 using the closest neighborhood method described earlier in which problem 1 is likely to occur (step S19)" (col 13, lines 5-15**), and by combining Mahy's teaching with Shimizu et al's reference, dimensional order of 3-ink can be reduced to a two-ink process, which, can improve the out of gamut color control process.

Having a system of Shimizu' 277 reference and then given the well-established teaching of Mahy' 109 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Shimizu' 277 reference to include that transforming said particular dimensional order of said color which was determined to have attained said gamut limit, in response to dynamically

determining which color value among said plurality of color values has attained gamut limit; and thereafter automatically reducing said particular dimensional order through use of a dedicated gamut mapping function utilized to determine surface points and axes, thereby allowing for an improved estimate of said color based on said reduced dimensional order, thereby providing improved control for colors that are located external to said gamut and maintaining said color's hue as taught by Mahy' 109 reference. The motivation for doing so would have been to improve the control of an L*a*b* value of a certain color which is outside a target color gamut and hence for better image reproduction quality, and further the mathematical model provided by Mahy' 109 could be implemented by one another with predictable results.

Regarding **claim 2**, in accordance with claim 1.

Shimizu discloses wherein a color sensor (**e.g. measurement of L*a*b* values indicates that a color sensor must be used for color measuring, col 11, lines 65-67 & col 12, lines 1-19**) is used in dynamically determining which color value among said plurality of color values has attained a gamut limit (**Shimizu discloses a flowchart or algorithm which has a steps to determine shortest distance from boundary of color gamut in Figs. 7 & 9, to obtain CMY value corresponding to an L*a*b* value based on the measurement value of a patch outputted from the printer; thus the distance between a point whether inside or outside the gamut and the boundary of gamut must be dynamically determined utilizing a color sensor, col 11, line 60 to col 12, line 5**).

Regarding **claim 3**, recite identical features as claim 12, except claim 3 is a method claim. Thus, arguments similar to that presented above for claim 12 are also equally applicable to claim 3.

Regarding **claim 4**, recite identical features as claim 13, except claim 4 is a method claim. Thus, arguments similar to that presented above for claim 13 are also equally applicable to claim 4.

Regarding **claim 5**, recite identical features as claim 15, except claim 5 is a method claim. Thus, arguments similar to that presented above for claim 15 are also equally applicable to claim 5.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al (US 7,167,277) in view of Mahy (US 5,832,109) as applied to claim 1, and further in view of Terekhov (US 2004/0096104).

Regarding claim 6, in accordance with claim 1.

Shimizu does not disclose wherein a ray-based approach consisting of a ray being drawn from a desired color to a point on a neutral axis through said gamut limit is used to perform said gamut mapping.

Terekhov teaches wherein a ray-based approach consisting of a ray being drawn from a desired color to a point on a neutral axis through said gamut limit is used to perform said gamut mapping (**refer to Figs. 8A, 8B and 9, a ray-based approach consisting of a ray from L*-axis, a neutral axis through gamut limit is used for gamut mapping, Par. 63**)

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu and Mahy to include wherein a ray-based approach consisting of a ray being drawn from a desired color to a point on a neutral axis through said gamut limit is used to perform said gamut mapping as taught by Terekhov to improve color mapping of gamut because gamut mapping requires coordinates of the points having the maximal chromaticity for a current gamut boundary (par. 71). Therefore, by combining Shimizu and Mahy with Terekhov, a predictable success of gamut mapping can be achieved.

8. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al (Shimizu) (US 7,167,277) in view of Mahy (US 5,832,109) and further in view of Terekhov (US 2004/0096104) as applied to claim 6, and further in view of Holub (US 6,750,992).

Regarding **claims 7 and 8**, in accordance with claim 6.

Shimizu and Mahy differ from claims 7 and 8, in that the combination of Shimizu, Mahy and Terekhov does not teach wherein said color sensor comprises an offline sensor and an inline sensor.

Holub teaches wherein said color sensor comprises an offline sensor (**referring to Fig. 3A, and col 11, lines 66-67 & col 12, lines 1-19, an offline sensor, a color measuring instrument, or CMI for measuring the color output of the rendering device)** and an inline sensor **(referring to Figs. 3B-C, and col 15, lines 42-67 & col**

16, lines 1-24, an inline sensor, a CMI as a unitary colorimeter SOM 13 take color measurements via lens system by connecting to the fiber optic pickup).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the combination of Shimizu, Mahy and Terekhov to include an offline sensor and an inline sensor taught by Holub to improve communication, control and quality of color reproduction (**col 3, lines 3-15**). Therefore, by combining the combination of Shimizu, Mahy and Terekhov with Holub, a predictable success of controlling out-of-gamut memory and index color can be achieved.

9. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al (Shimizu) (US 7,167,277) in view of Ohkub (US 6,229,916).

Regarding claim 23.

Shimizu discloses a method, comprising: automatically providing a plurality of desired L*a*b* memory color values (**such as L255*, a255* & b255*, memory values, corresponding to CMY color data value, col 2, lines 28-59, and as shown in Fig. 5, L*a*b* value is input to the system for process, col 10, lines 10-35**) as input to a transformation module (**e.g. L*a*b* values based on the measurement of a patch outputted from the printer corresponding to CYM values are as input initial value; since the L*a*b* values obtained and inputted in the process are not manually performed, rather, the programmed process is executed and performed by a computer of Figs. 18 and 19, thus, data is automatically provided as input to the image processing device shown in Figs. 18 & 19; see Fig. 5, col 10, lines 12-16**);

transforming said L*a*b* memory color values into NDC memory color values using a transformation function (**referring to Fig. 5, Step 5, L*a*b* is converted, or transformed, col 10, lines 12-35, and Fig. 6 shows color point, i.e. P6, or NDC, located outside of color gamut**); providing said compensated CMY color values as input to a graphical rendering device (**i.e. "in order to output a color of a certain L*a*b* value on a printer, it is sufficient to convert the L*a*b* value to an appropriate CMY value according to the color processing characteristics of the CMY value of each printer and to transmit the CMY value to a printer to print the color. Basically, by compensating for color processing characteristics", col 1, lines 54-60**); printing patches of said compensated CMY color values (**i.e. patches corresponding to CMY values outputted from a printer, col 12, lines 5-9**); generating measured L*a*b* values for said patches (**i.e. L*a*b* values are obtained by measuring the patch, col 12, lines 5-9**); providing said patches as input to a color sensor (**i.e. CMY patch outputted from a printer is measured to determine CMY color value in CMY space, and L*a*b* values are therefore obtained; thus, patches must be as input to a color sensor or color measurement device, col 11, line 65 to col 12, line 19**); providing said measured L*a*b* values as input to a second transformation module which transforms said L*a*b* values into NCD values (**referring to Fig. 5, Step 5, L*a*b* is converted, or transformed, col 10, lines 12-35, and Fig. 6 shows color point, i.e. P6, or NDC, located outside of color gamut**); thereby completing a feedback loop which minimizes the error between the measured color and the desired L*a*b* memory color providing improved control for colors that are located

external to said gamut (**referring to Fig. 7, steps 11 to 22 are repeated when a color point falls outside of gamut until it values are adjusted, or transformed within the gamut, col 12, line 42 to col 14, line 11**).

Shimizu does not disclose providing said NCD memory color values to an adder; providing the output from said adder as input to an iterative controller which outputs compensated CMY color values; providing said patches as input to a color sensor.

In the same field of endeavor, Ohkubo teaches said NCD memory color values to an adder (**i.e. referring to Fig. 13, if a color point is judged that is outside of a gamut, then L*a*b* value is adjusted, and added back into the loop, and repeat steps 3, 4 & 5, until the L*a*b* value is within the gamut; thus, in this process, NCD values, or the value of a color point outside the gamut is added into the loop for processing, col 30, lines 4-19**); providing the output from said adder as input to an iterative controller which outputs compensated CMY color values (**referring to Fig. 13, as stated above, if a color point is judged that is outside of a gamut, then L*a*b* value is adjusted, and added back into the loop, and repeat steps 3, 4 & 5, until the L*a*b* value is within the gamut; thus, in this process, NCD values, or the value of a color point outside the gamut is added into the loop for processing, col 30, lines 4-19**).

Shimizu and Ohkubo are combinable because of these references are in the same filed of endeavor of controlling, converting or transforming color outside of a color gamut, or outside of the range or limit of image reproduction that a rendering device, i.e. printer, can handle and therefore, to improve image reproduction quality.

Having a method of Shimizu ‘277 reference and then given the well-established teaching of Ohkubo ‘916 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Shimizu’ 277 reference to include providing said NCD memory color values to an adder, and providing the output from said adder as input to an iterative controller which outputs compensated CMY color values as taught by Ohkubo ‘916 reference. The motivation for doing so would have been to improve the control of color which is outside a target color gamut, and hence for better image reproduction quality, and further the disclosure provided by Ohkubo ‘916 could be implemented by one another with predictable results.

CONTACT INFORMATION

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Kau whose telephone number is 571-270-1120 and fax number is 571-270-2120. The examiner can normally be reached on M-F, 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Steven Kau/
Examiner, Art Unit 2625
January 16, 2010

/David K Moore/

Supervisory Patent Examiner, Art Unit 2625